

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of:

Mingliang L. Tsai

Docket: H0001805 (4300)

Serial Number: 09/800,749

Group Art Unit: 1772

Filed: March 7, 2001

Examiner: Sandra M. Nolan

For: OXYGEN SCAVENGING POLYMER COMPOSITIONS CONTAINING
ETHYLENE VINYL ALCOHOL COPOLYMERS**FAX COVER SHEET**
SUBMISSION OF CONFORMED CLAIMSTO: Commissioner For Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

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GROUP : 1772NO. OF PAGES SENT INCLUDING THIS COVER SHEET: 9

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Sir:

In response to the examiner's telephonic request of April 29, 2004, please enter the following claims which are conformed from all prior amendments.

1. (Previously Presented) An oxygen-scavenging polymer composition consisting essentially of:

- a) at least one ethylene vinyl alcohol copolymer;
- b) at least one oxidizable epoxy or anhydride functional polybutadiene; and
- c) at least one metal salt catalyst.

2-3. Canceled.

4. (Previously Presented) The composition of claim 1 wherein the oxidizable epoxy or anhydride functional polybutadiene comprises particles which are substantially uniformly distributed in the polymer composition.

5. (Previously Presented) The composition of claim 1 wherein the oxidizable epoxy or anhydride functional polybutadiene comprises particles whose average particle size is in the range of from about 10 nm to about 5000 nm, and which particles are substantially uniformly distributed in the polymer composition.
6. (Original) The composition of claim 1 wherein the metal salt catalyst is a metal carboxylate salt.
7. (Original) The composition of claim 1 wherein the metal salt catalyst is selected from the group consisting of metal acetates, stearates, propionates, hexanoates, octanoates, benzoates, salicylates, cinnamates and combinations thereof.
8. (Original) The composition of claim 1 wherein the metal salt catalyst is selected from the group consisting of a cobalt, copper or ruthenium, acetate, stearate, propionate, hexanoate, octanoate, benzoate, salicylate or cinnamate, and combinations thereof.
9. (Original) The composition of claim 1 further comprising a base catalyst.
10. (Original) The composition of claim 1 wherein ethylene vinyl alcohol copolymer is retortable.
11. (Original) The composition of claim 1 further comprising a clay.
12. (Original) The composition of claim 1 further comprising a clay whose average platelet thickness is in the range of from about 1 nm to about 100 nm and whose average length and average width are each in the range of from about 50 nm to about 500 nm.
13. (Previously Presented) The polymer composition of claim 1 wherein the composition consists essentially of a blend of at least one ethylene vinyl alcohol copolymer, at least one oxidizable epoxy or anhydride functional polybutadiene, and at least one metal carboxylate salt catalyst.

14. (Previously Presented) The polymer composition of claim 1 wherein the composition consists essentially of a reaction product of at least one ethylene vinyl alcohol copolymer, at least one oxidizable epoxy or anhydride functional polybutadiene, and at least one metal carboxylate salt catalyst.

15. (Previously Presented) An oxygen barrier film comprising a layer of a polymer composition which consists essentially of:

- a) at least one ethylene vinyl alcohol copolymer;
- b) at least one oxidizable epoxy or anhydride functional polybutadiene; and
- c) at least one metal salt catalyst.

16. (Original) The oxygen barrier film of claim 15 which is oriented.

17. (Original) The oxygen barrier film of claim 15 further comprising a thermoplastic polymer layer on one or both sides of the polymer composition layer.

18. (Original) The oxygen barrier film of claim 15 wherein the polymer composition further comprises a clay.

19. (Previously Presented) A multilayer article which comprises:

- a) a polymer composition layer consisting essentially of at least one ethylene vinyl alcohol copolymer; at least one oxidizable epoxy or anhydride functional polybutadiene; and at least one metal salt catalyst; and
- b) a thermoplastic polymer layer on one or both sides of the polymer composition layer.

20. (Original) The multilayer article of claim 19 wherein the thermoplastic polymer layer comprises a polyolefin, polyester, or polycarbonate.

21. (Original) The multilayer article of claim 19 wherein the thermoplastic polymer layer comprises a polyethylene terephthalate.

22. (Original) The multilayer article of claim 19 wherein the thermoplastic polymer layer and polymer composition layer are attached to one another by coextrusion, lamination or coinjection.

23. (Original) The multilayer article of claim 19 wherein the polymer composition layer further comprises a clay.

24. (Previously Presented) A shaped article which comprises a polymer composition which consists essentially of:

- a) at least one ethylene vinyl alcohol copolymer;
- b) at least one oxidizable epoxy or anhydride functional polybutadiene; and
- c) at least one metal salt catalyst.

25. (Original) The shaped article of claim 24 wherein the polymer composition further comprises a clay.

26. (Original) The shaped article of claim 24 which is in the form of a bottle or container.

27. (Previously Presented) A process for producing a polymer composition which comprises:

- a) melting at least one ethylene vinyl alcohol copolymer;
- b) blending the molten copolymer with at least one oxidizable [polydiene] epoxy or anhydride functional polybutadiene and at least one metal salt catalyst to thereby form a mixture which consists essentially of the ethylene vinyl alcohol copolymer, epoxy or anhydride functional polybutadiene and metal salt catalyst; and
- c) cooling the mixture.

28. (Original) The process of claim 27 which comprises a clay preblended with the ethylene vinyl alcohol copolymer.

29. (Previously Presented) A process for producing an oxygen barrier film which comprises:

- a) melting at least one ethylene vinyl alcohol copolymer;
- b) blending the molten copolymer with at least one oxidizable epoxy or anhydride functional polybutadiene and at least one metal salt catalyst to thereby form a mixture which consists essentially of the ethylene vinyl alcohol copolymer, epoxy or anhydride functional polybutadiene and metal salt catalyst;
- c) extruding, casting or blowing the mixture into a film; and
- d) cooling the film.

30. (Original) The process of claim 29 wherein the film is subsequently oriented in at least one direction.

31. (Original) The process of claim 29 which comprises a clay preblended with the ethylene vinyl alcohol copolymer.

32. (Previously Presented) A process for producing an oxygen barrier polymer film which comprises:

- a) melting a composition which consists essentially of at least one ethylene vinyl alcohol copolymer; at least one oxidizable epoxy or anhydride functional polybutadiene; and at least one metal salt catalyst;
- b) extruding, casting or blowing the composition into a film; and
- c) cooling the film.

33. (Previously Presented) A process for producing a multilayer article which comprises

- a) melting at least one ethylene vinyl alcohol copolymer; at least one oxidizable epoxy or anhydride functional polybutadiene; and at least one metal salt catalyst to thereby form a mixture which consists essentially of the ethylene vinyl alcohol copolymer, epoxy or anhydride functional polybutadiene and metal salt catalyst;
- b) separately melting a thermoplastic polymer composition;

- c) coextruding, casting, blowing, thermoforming, blow molding or coinjecting the mixture and thermoplastic polymer composition into a multilayer article; and
- d) cooling the article.

34. (Original) The process of claim 33 wherein the article is in the form of a film, a bottle or a container.

35. (Original) The process of claim 33 wherein the article is a film which is subsequently oriented in at least one direction.

36. (Previously Presented) The process of claim 33 wherein said copolymer is melted prior to blending with said oxidizable epoxy or anhydride functional polybutadiene.

37. (Previously Presented) The process of claim 33 wherein said copolymer and said oxidizable epoxy or anhydride functional polybutadiene are melted after blending.

38. The process of claim 33 which comprises a clay preblended with the ethylene vinyl alcohol copolymer.

39. (Previously Presented) A process for producing a multilayer article which comprises:

- a) melting at least one ethylene vinyl alcohol copolymer; at least one oxidizable epoxy or anhydride functional polybutadiene; and at least one metal salt catalyst to thereby form a mixture which consists essentially of the ethylene vinyl alcohol copolymer, epoxy or anhydride functional polybutadiene and metal salt catalyst;
- b) separately melting a thermoplastic polymer composition;
- c) coinjecting molding the mixture and thermoplastic polymer composition into a multilayer preform;
- d) reheating the perform; and
- e) blow molding the perform into a multilayer article.

40. (Original) A multilayer article formed by the process of claim 39.

41. (Previously Presented) An oxygen-scavenging polymer composition which comprises:

- a) at least one ethylene vinyl alcohol copolymer;
- b) at least one oxidizable, anhydride functional polybutadiene; and
- c) at least one metal salt catalyst.

42. (Previously Presented) The composition of claim 41 wherein the oxidizable, anhydride functional polybutadiene comprises particles which are substantially uniformly distributed in the polymer composition.

43. (Previously Presented) The composition of claim 41 wherein the oxidizable, anhydride functional polybutadiene comprises particles whose average particle size is in the range of from about 10 nm to about 5000 nm, and which particles are substantially uniformly distributed in the polymer composition.

44. (Previously Presented) The composition of claim 41 further comprising a base catalyst.

45. (Previously Presented) The composition of claim 41 further comprising a clay.

46. (Previously Presented) The composition of claim 41 wherein the composition comprises a blend of at least one ethylene vinyl alcohol copolymer, at least one oxidizable, anhydride functional polybutadiene and at least one metal carboxylate salt catalyst.

47. (Previously Presented) The composition of claim 41 wherein the composition comprises a reaction product of at least one ethylene vinyl alcohol copolymer, at least one oxidizable, anhydride functional polybutadiene and at least one metal carboxylate salt catalyst.